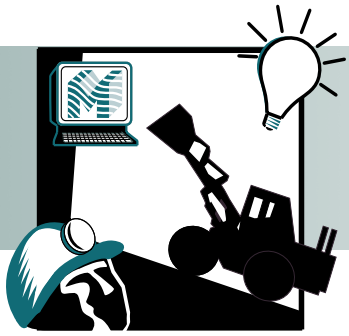
MINING

Project Fact Sheet



Three-Dimensional Simulation of Charge Motion in Semiautogenous Grinding (SAG) and Ball Mills for Energy Efficiency

Benefits

- Estimated energy savings of 30% in SAG mill operations
- Reduced ball consumption and equipment wear
- Operational cost-savings near $4 million per year

Application

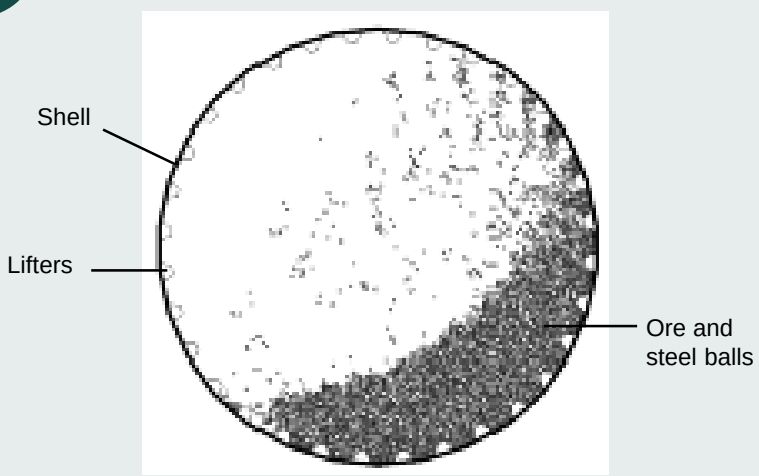
This technology applies directly to most crushing and grinding operations.

Three-dimensional simulation increases energy efficiency and decreases equipment wear

The throughput of grinding mills depends on the motion of charge within the mills, which in turn, depends on the lifter design and mill speed. The purpose of this research is to develop a three-dimensional simulation that will allow for better lifter design and operating conditions.

Today's semiautogenous grinding (SAG) mills expend large amounts of energy and consume tons of steel balls and shell liners while processing ore. A considerable amount of energy is expended on unwanted ball strikes on the mill shell. These strikes also cause wear on the balls and the shell. Unfortunately, the environment inside the SAG mill is too harsh to place sensors to obtain real data about the operation of the mills. Since real data about the conditions inside cannot be obtained, simulations offer the best solution to improving its operation and improving energy efficiency. Through simulations and testing, lifter design and mill speed can be optimized, resulting in increased energy efficiency and operational cost savings.

SAG Mill



Cross-section view of a SAG mill.

Project Description

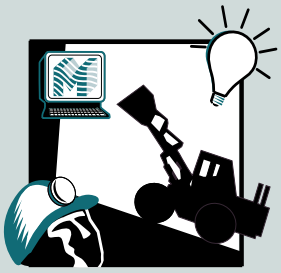
Objective: To develop a three-dimensional simulation software application which optimizes the operating conditions of grinding mills.

Partners in this project will work to develop new software code for a 3-D simulation package. The first step in conducting the project will be to develop the background information and the basis for the software code. The code will be enhanced and a graphical interface and visualization code will be added. Tests for each section of the code will then be conducted at two SAG mill operations, where actual milling operations data will be gathered and reviewed.

Progress and Milestones

This project includes the following activities:

- Develop code to simulate SAG shell wall
- Develop code to simulate ball collision
- Link 3-D code and visualization code to simulate SAG mill operation
- Complete testing in SAG mills



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